H0538- [illegible]

0052382

RECEIVED JAN 18 2000 EDMC

Thermo Nutech
W.O. No. N9-09-154-7215

Bechtel Hanford Inc.
SDG H0538

Case Narrative

1.0 GENERAL

Bechtel Hanford Inc. Sample Delivery Group H0538 is composed of one solid (soil) sample designated under SAF No. B99-075 with a Project Designation of: 105-DR FSB-Soil.

The sample was received as stated on the Chain-of-Custody document. Any discrepancies are noted on the TNU Sample Receipt Checklist. The results for Gamma Scan, Isotopic Plutonium and Carbon-14 were transmitted to BHI via facsimile on October 8, 1999 while the remaining analytes were reported via fax to BHI on October 18, 1999.

2.0 ANALYSIS NOTES

2.1 Gamma Scan Analyses

No problems were encountered during the course of the analyses.

2.2 Isotopic Uranium Analyses

No problems were encountered during the course of the analyses. A recount was performed on the sample (B0WCH8).

2.3 Isotopic Plutonium Analyses

No problems were encountered during the course of the analyses.

2.4 Carbon-14 Analyses

No problems were encountered during the course of the analyses.

2.5 Americium-241 Analyses

No problems were encountered during the course of the analyses.

2.6 Technetium-99 Analyses

No problems were encountered during the course of the analyses. A recount was performed on the Blank. The Tc99 activity observed in the blank sample was slightly greater than the blank sample MDA however was less than the RDL.

2.7 Nickel-63 Analyses

No problems were encountered during the course of the analyses.

TMA/RICHMOND

SAMPLE DELIVERY GROUP H0538

SAMPLE SUMMARY

SDG 7215
Contact Kevin C. Johnson

Client Hanford
Contract TRB-SBB-207925
Case no SDG H0538

CLIENT SAMPLE ID	LOCATION	MATRIX	LEVEL	LAB SAMPLE ID	SAF NO	CHAIN OF CUSTODY	COLLECTED
B0WCH8	105 DR	SOLID		N909154-01	B99-075	B99-075-16	09/20/99 09:00
Method Blank		SOLID		N909154-03	B99-075		
Lab Control Sample		SOLID		N909154-02	B99-075		
Duplicate (N909154-01)	105 DR	SOLID		N909154-04	B99-075		09/20/99 09:00

Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-CS
Version 3.06
Report date 10/18/99

TMA/RICHMOND

SAMPLE DELIVERY GROUP H0538

SDG 7215
Contact Kevin C. Johnson

QC SUMMARY

Client Hanford
Contract TRB-SBB-207925
Case no SDG H0538

QC BATCH	CHAIN OF CUSTODY	CLIENT SAMPLE ID	MATRIX	% SOLIDS	SAMPLE AMOUNT	BASIS AMOUNT	DAYS RECEIVED	DAYS COLL	LAB SAMPLE ID	DEPARTMENT SAMPLE ID
7215	B99-075-16	B0WCH8	SOLID	94.8			09/22/99	2	N909154-01	7215-001
		Method Blank	SOLID						N909154-03	7215-003
		Lab Control Sample	SOLID						N909154-02	7215-002
		Duplicate (N909154-01)	SOLID	94.8			09/22/99	2	N909154-04	7215-004

Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-QS
Version 3.06
Report date 10/18/99

TMA/RICHMOND

SAMPLE DELIVERY GROUP H0538

PREP BATCH SUMMARY

SDG 7215
Contact Kevin C. Johnson

Client Hanford
Contract TRB-SBB-207925
Case no SDG H0538

TEST	MATRIX	METHOD	PREPARATION BATCH	ERROR 2σ %	PLANCHETS ANALYZED CLIENT	MORE	RE	BLANK	LCS	DUP/ORIG	MS/ORIG	QUALIFIERS
Alpha Spectroscopy												
AM	SOLID	Americium 241 in Soil	6904-023	5.0	1			1	1	1/1		
PU	SOLID	Plutonium, Isotopic in Solids	6904-023	5.0	1			1	1	1/1		
U	SOLID	Uranium, Isotopic in Soil	6904-023	5.0	1			1	1	1/1		
Beta Counting												
TC	SOLID	Technetium 99 in Soil	6904-023	10.0	1			1	1	1/1		
Gamma Spectroscopy												
GAM	SOLID	Gamma Scan	6904-023	15.0	1			1	1	1/1		X
Liquid Scintillation Counting												
C	SOLID	Carbon 14 in Soil	6904-023	10.0	1			1	1	1/1		
NI_L	SOLID	Nickel 63 in Soil	6904-023	10.0	1			1	1	1/1		

Duplicates and Matrix Spikes are those with original (Client) sample in this Sample Delivery Group.
Blank and LCS planchets are those in the same preparation batch as some Client, Duplicate or Spike sample.

Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-PBS
Version 3:06
Report date 10/18/99

TMA/RICHMOND

SAMPLE DELIVERY GROUP H0538

WORK SUMMARY

SDG 7215
Contact Kevin C. Johnson

Client Hanford
Contract TRB-SBB-207925
Case no SDG H0538

CLIENT SAMPLE ID / LOCATION / CUSTODY	SAF No	MATRIX	LAB SAMPLE ID / COLLECTED / RECEIVED	PLANCHET	TEST	SUF-FIX	ANALYZED	REVIEWED	BY	METHOD
B0WCH8			N909154-01	7215-001	AM		10/15/99	10/18/99	NJV	Americium 241 in Soil
105 DR		SOLID	09/20/99	7215-001	C		10/09/99	10/13/99	NJV	Carbon 14 in Soil
B99-075-16	B99-075		09/22/99	7215-001	GAM		09/30/99	10/13/99	NJV	Gamma Scan
				7215-001	NI_L		10/11/99	10/18/99	NJV	Nickel 63 in Soil
				7215-001	PU		10/10/99	10/13/99	NJV	Plutonium, Isotopic in Solids
				7215-001	TC		10/11/99	10/18/99	NJV	Technetium 99 in Soil
				7215-001	U		10/15/99	10/18/99	NJV	Uranium, Isotopic in Soil
Method Blank			N909154-03	7215-003	AM		10/15/99	10/18/99	NJV	Americium 241 in Soil
		SOLID		7215-003	C		10/09/99	10/13/99	NJV	Carbon 14 in Soil
	B99-075			7215-003	GAM		10/01/99	10/13/99	NJV	Gamma Scan
				7215-003	NI_L		10/11/99	10/18/99	NJV	Nickel 63 in Soil
				7215-003	PU		10/10/99	10/13/99	NJV	Plutonium, Isotopic in Solids
				7215-003	TC		10/12/99	10/18/99	NJV	Technetium 99 in Soil
				7215-003	U		10/14/99	10/18/99	NJV	Uranium, Isotopic in Soil
Lab Control Sample			N909154-02	7215-002	AM		10/15/99	10/18/99	NJV	Americium 241 in Soil
		SOLID		7215-002	C		10/10/99	10/13/99	NJV	Carbon 14 in Soil
	B99-075			7215-002	GAM		10/01/99	10/13/99	NJV	Gamma Scan
				7215-002	NI_L		10/11/99	10/18/99	NJV	Nickel 63 in Soil
				7215-002	PU		10/10/99	10/13/99	NJV	Plutonium, Isotopic in Solids
				7215-002	TC		10/11/99	10/18/99	NJV	Technetium 99 in Soil
				7215-002	U		10/14/99	10/18/99	NJV	Uranium, Isotopic in Soil
Duplicate (N909154-01)			N909154-04	7215-004	AM		10/15/99	10/18/99	NJV	Americium 241 in Soil
105 DR		SOLID	09/20/99	7215-004	C		10/09/99	10/13/99	NJV	Carbon 14 in Soil
	B99-075		09/22/99	7215-004	GAM		10/01/99	10/13/99	NJV	Gamma Scan
				7215-004	NI_L		10/11/99	10/18/99	NJV	Nickel 63 in Soil
				7215-004	PU		10/10/99	10/13/99	NJV	Plutonium, Isotopic in Solids
				7215-004	TC		10/12/99	10/18/99	NJV	Technetium 99 in Soil
				7215-004	U		10/14/99	10/18/99	NJV	Uranium, Isotopic in Soil

Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-CWS
Version 3.06
Report date 10/18/99

SDG 7215
Contact Kevin C. Johnson

WORK SUMMARY, cont.

Client Hanford
Contract TRB-SBB-207925
Case no SDG H0538

COUNTS OF TESTS BY SAMPLE TYPE

TEST	SAF No	METHOD	REFERENCE	CLIENT	MORE	RE	BLANK	LCS	DUP SPIKE	TOTAL
AM	B99-075	Americium 241 in Soil	AM/CMPLATE	1			1	1	1	4
C	B99-075	Carbon 14 in Soil	C14COXLSC	1			1	1	1	4
GAM	B99-075	Gamma Scan	GAMMAHI	1			1	1	1	4
NI_L	B99-075	Nickel 63 in Soil	NI63LSC	1			1	1	1	4
PU	B99-075	Plutonium, Isotopic in Solids	PUPLATE	1			1	1	1	4
TC	B99-075	Technetium 99 in Soil	TC99TRLSC	1			1	1	1	4
U	B99-075	Uranium, Isotopic in Soil	UPLATE	1			1	1	1	4
TOTALS				7			7	7	7	28

Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-CWS
Version 3.06
Report date 10/18/99

TMA / RICHMOND

SAMPLE DELIVERY GROUP H0538

N909154-03 Method Blank

METHOD BLANK

SDG 7215 Client/Case no Hanford SDG H0538
Contact Kevin C. Johnson Contract TRB-SBB-207925

Lab sample id N909154-03 Client sample id Method Blank
Dept sample id 7215-003 Material/Matrix SOLID
SAF No B99-075

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI-FIERS	TEST
Carbon 14	14762-75-5	1.82	2.7	4.5	50	U	C
Technetium 99	14133-76-7	0.478	0.27	0.40	15	J	TC
Uranium 233/234	U-233/234	0.004	0.012	0.025	1.0	U	U
Uranium 235	15117-96-1	-0.002	0.005	0.019	1.0	U	U
Uranium 238	U-238	0.002	0.004	0.016	1.0	U	U
Plutonium 238	13981-16-3	0.010	0.015	0.028	1.0	U	PU
Plutonium 239/240	PU-239/240	0.003	0.020	0.041	1.0	U	PU
Nickel 63	13981-37-8	0.483	1.2	2.1	30	U	NI_L
Americium 241	14596-10-2	0	0.050	0.10	1.0	U	AM
Potassium 40	13966-00-2	U		0.21		U	GAM
Barium 133	13981-41-4	U		2.5		UX	GAM
Cobalt 60	10198-40-0	U		0.018	0.050	U	GAM
Cesium 137	10045-97-3	U		0.014	0.10	U	GAM
Europium 152	14683-23-9	U		0.042	0.10	U	GAM
Europium 154	15585-10-1	U		0.049	0.10	U	GAM
Europium 155	14391-16-3	U		0.030	0.10	U	GAM
Radium 226	13982-63-3	U		0.030	0.10	U	GAM
Radium 228	15262-20-1	U		0.064	0.20	U	GAM
Thorium 228	14274-82-9	U		0.023		U	GAM
Thorium 232	TH-232	U		0.064		U	GAM
Americium 241	14596-10-2	U		0.031		U	GAM
Uranium 238	U-238	U		2.1		U	GAM
Uranium 235	15117-96-1	U		0.047		U	GAM

105-DR FSB-Soil

QC-BLANK 31900

Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-DS
Version 3.06
Report date 10/18/99

TMA/RICHMOND

SAMPLE DELIVERY GROUP H0538

N909154-02 Lab Control Sample

LAB CONTROL SAMPLE

SDG 7215 Client/Case no Hanford SDG H0538

Contact Kevin C. Johnson Case no TRB-SBB-207925

Lab sample id N909154-02 Client sample id Lab Control Sample

Dept sample id 7215-002 Material/Matrix SOLID

SAF No B99-075

ANALYTE	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI-FIERS	TEST	ADDED pCi/g	2σ ERR pCi/g	REC %	3σ LMTS (TOTAL)	PROTOCOL LIMITS
Carbon 14	9730	200	28	50		C	10600	420	92	85-115	
Technetium 99	50.4	1.7	0.58	15		TC	54.6	2.2	92	84-116	80-120
Uranium 233/234	5.23	0.67	0.31	1.0		U	4.64	0.19	113	76-124	80-120
Uranium 235	4.00	0.57	0.092	1.0		U	3.77	0.15	106	75-125	80-120
Uranium 238	5.15	0.67	0.30	1.0		U	5.04	0.20	102	78-122	80-120
Plutonium 238	12.7	0.82	0.028	1.0		PU	12.5	0.50	102	86-114	80-120
Plutonium 239/240	12.7	0.82	0.023	1.0		PU	13.2	0.53	96	87-113	80-120
Nickel 63	134	3.6	1.9	30		NI_L	134	5.4	100	83-117	
Americium 241	9.65	0.66	0.059	1.0		AM	9.58	0.38	101	86-114	80-120
Cobalt 60	1.47	0.076	0.036	0.050		GAM	1.61	0.064	91	77-123	80-120
Cesium 137	1.50	0.062	0.040	0.10		GAM	1.64	0.066	91	78-122	80-120

105-DR FSB-Soil

QC-LCS 31899

Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-LCS
Version 3.06
Report date 10/18/99

TMA/RICHMOND

SAMPLE DELIVERY GROUP H0538

N909154-04 B0WCH8

DUPLICATE

SDG 7215 Client/Case no Hanford SDG H0538

Contact Kevin C. Johnson Case no TRB-SBB-207925

DUPLICATE		ORIGINAL		
Lab sample id N909154-04	Lab sample id N909154-01	Client sample id B0WCH8		
Dept sample id 7215-004	Dept sample id 7215-001	Location/Matrix 105 DR	SOLID	
	Received 09/22/99	Collected 09/20/99 09:00		
% solids 94.8	% solids 94.8	Custody/SAF No B99-075-16	B99-075	

ANALYTE	DUPLICATE pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI-FIERS	TEST	ORIGINAL pCi/g	2σ ERR (COUNT)	MDA pCi/g	QUALI-FIERS	RPD %	3σ PROT TOT LIMIT
Carbon 14	8.90	3.1	5.0	50	J	C	6.91	3.1	5.0	J	25	86
Technetium 99	-0.181	0.22	0.38	15	U	TC	0.148	0.31	0.54	U	-	
Uranium 233/234	0.420	0.13	0.066	1.0	J	U	0.324	0.11	0.071	J	26	70
Uranium 235	0.010	0.021	0.079	1.0	U	U	0.067	0.045	0.086	U	-	
Uranium 238	0.343	0.11	0.066	1.0	J	U	0.333	0.11	0.071	J	3	70
Plutonium 238	0.007	0.022	0.041	1.0	U	PU	0.004	0.021	0.044	U	-	
Plutonium 239/240	0.026	0.022	0.035	1.0	U	PU	0.011	0.021	0.044	U	-	
Nickel 63	1.01	1.2	2.1	30	U	NI_L	0.839	1.4	2.3	U	-	
Americium 241	-0.007	0.036	0.069	1.0	U	AM	-0.004	0.023	0.047	U	-	
Potassium 40	16.2	8.3	0.44			GAM	15.0	8.3	0.60		8	117
Barium 133	U		0.043		UX	GAM	U		0.054	UX	-	
Cobalt 60	U		0.047	0.050	U	GAM	U		0.062	U	-	
Cesium 137	2.07	0.077	0.053	0.10		GAM	1.96	0.091	0.064		5	33
Europium 152	U		0.17	0.10	U	GAM	U		0.16	U	-	
Europium 154	U		0.13	0.10	U	GAM	U		0.16	U	-	
Europium 155	U		0.092	0.10	U	GAM	U		0.11	U	-	
Radium 226	U		0.11	0.10	U	GAM	U		0.14	U	-	
Radium 228	U		0.24	0.20	U	GAM	U		0.30	U	-	
Thorium 228	U		0.084		U	GAM	U		0.10	U	-	
Thorium 232	U		0.24		U	GAM	U		0.30	U	-	
Americium 241	U		0.047		U	GAM	U		0.060	U	-	
Uranium 238	U		5.2		U	GAM	U		6.5	U	-	
Uranium 235	U		0.16		U	GAM	U		0.20	U	-	

105-DR FSB-Soil

QC-DUP#1 31901

Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-DUP
Version 3.06
Report date 10/18/99

TMA / RICHMOND

SAMPLE DELIVERY GROUP H0538

N909154-01 B0WCH8

DATA SHEET

SDG 7215	Client/Case no Hanford	SDG H0538	
Contact Kevin C. Johnson	Contract TRB-SBB-207925		
Lab sample id N909154-01	Client sample id B0WCH8		
Dept sample id 7215-001	Location/Matrix 105 DR	SOLID	
Received 09/22/99	Collected 09/20/99 09:00		
% solids 94.8	Custody/SAF No B99-075-16	B99-075	

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI-FIERS	TEST
Carbon 14	14762-75-5	6.91	3.1	5.0	50	J	C
Technetium 99	14133-76-7	0.148	0.31	0.54	15	U	TC
Uranium 233/234	U-233/234	0.324	0.11	0.071	1.0	J	U
Uranium 235	15117-96-1	0.067	0.045	0.086	1.0	U	U
Uranium 238	U-238	0.333	0.11	0.071	1.0	J	U
Plutonium 238	13981-16-3	0.004	0.021	0.044	1.0	U	PU
Plutonium 239/240	PU-239/240	0.011	0.021	0.044	1.0	U	PU
Nickel 63	13981-37-8	0.839	1.4	2.3	30	U	NI_L
Americium 241	14596-10-2	-0.004	0.023	0.047	1.0	U	AM
Potassium 40	13966-00-2	15.0	8.3	0.60			GAM
Barium 133	13981-41-4	U		0.054		UX	GAM
Cobalt 60	10198-40-0	U		0.062	0.050	U	GAM
Cesium 137	10045-97-3	1.96	0.091	0.064	0.10		GAM
Europium 152	14683-23-9	U		0.16	0.10	U	GAM
Europium 154	15585-10-1	U		0.16	0.10	U	GAM
Europium 155	14391-16-3	U		0.11	0.10	U	GAM
Radium 226	13982-63-3	U		0.14	0.10	U	GAM
Radium 228	15262-20-1	U		0.30	0.20	U	GAM
Thorium 228	14274-82-9	U		0.10		U	GAM
Thorium 232	TH-232	U		0.30		U	GAM
Americium 241	14596-10-2	U		0.060		U	GAM
Uranium 238	U-238	U		6.5		U	GAM
Uranium 235	15117-96-1	U		0.20		U	GAM

105-DR FSB-Soil

Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-DS
Version 3.06
Report date 10/18/99

TMA/RICHMOND

SAMPLE DELIVERY GROUP H0538

Test AM Matrix SOLID
SDG 7215
Contact Kevin C. Johnson

METHOD SUMMARY

AMERICIUM 241 IN SOIL

ALPHA SPECTROSCOPY

Client Hanford
Contract TRB-SBB-207925
Case no SDG H0538

RESULTS

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST	SUF-FIX	PLANCHET	Americium 241
Preparation batch 6904-023					
B0WCH8	N909154-01			7215-001	U
BLK (QC ID=31900)	N909154-03			7215-003	U
LCS (QC ID=31899)	N909154-02			7215-002	ok
Duplicate (N909154-01)	N909154-04			7215-004	- U
Nominal values and limits from method 105-DR FSB-Soil				RDLs (pCi/g)	1.0

METHOD PERFORMANCE

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST	SUF-FIX	MDA pCi/g	ALIQ g	PREP FAC	DILU-TION	YIELD %	EFF %	COUNT min	FWHM keV	DRIFT KeV	DAYS HELD	PREPARED	ANAL-YZED	DETECTOR
Preparation batch 6904-023 2σ prep error 5.0 % Reference Lab Notebook 6904 pg. 023																
B0WCH8	N909154-01			0.047	0.500			82		744			25	10/15/99	10/15	SS-027
BLK (QC ID=31900)	N909154-03			0.10	0.500			37		744				10/15/99	10/15	SS-031
LCS (QC ID=31899)	N909154-02			0.059	0.500			88		744				10/15/99	10/15	SS-029
Duplicate (N909154-01) (QC ID=31901)	N909154-04			0.069	0.500			85		744			25	10/15/99	10/15	SS-032
Nominal values and limits from method				1.0	0.500			20-105		.700	100		180			

PROCEDURES	REFERENCE	AM/CMPLATE
	EP-060	Soil Preparation, rev 0
	EP-070	Soil Dissolution, rev 0
	EP-940	Plutonium Purification, rev 0
	EP-960	Americium-Curium Purification, rev 0
	EP-008	Heavy Elements Electroplating, rev 0

AVERAGES ± 2 SD FOR 4 SAMPLES
MDA 0.069 ± 0.045
YIELD 73 ± 48

Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-CMS
Version 3.06
Report date 10/18/99

TMA/RICHMOND

SAMPLE DELIVERY GROUP H0538

METHOD SUMMARY

PLUTONIUM, ISOTOPIC IN SOLIDS

ALPHA SPECTROSCOPY

Test PU Matrix SOLID
SDG 7215
Contact Kevin C. Johnson

Client Hanford
Contract TRB-SBB-207925
Case no SDG H0538

RESULTS

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST	SUF-FIX	PLANCHET	Plutonium 238		Plutonium 239/240	
Preparation batch 6904-023								
B0WCH8	N909154-01			7215-001	U		U	
BLK (QC ID=31900)	N909154-03			7215-003	U		U	
LCS (QC ID=31899)	N909154-02			7215-002	ok		ok	
Duplicate (N909154-01)	N909154-04			7215-004	-	U	-	U
Nominal values and limits from method				RDLs (pCi/g)	1.0		1.0	
105-DR FSB-Soil								

METHOD PERFORMANCE

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST	SUF-FIX	MAX MDA pCi/g	ALIQ g	PREP FAC	DILU-TION	YIELD %	EFF %	COUNT min	FWHM keV	DRIFT KeV	DAYS HELD	PREPARED	ANAL-YZED	DETECTOR
Preparation batch 6904-023 2σ prep error 5.0 % Reference Lab Notebook 6904 pg. 023																
B0WCH8	N909154-01			0.044	0.500			60		1086			20	10/09/99	10/10	SS-005
BLK (QC ID=31900)	N909154-03			0.041	0.500			82		1086				10/09/99	10/10	SS-010
LCS (QC ID=31899)	N909154-02			0.028	0.500			74		1089				10/09/99	10/10	SS-056
Duplicate (N909154-01) (QC ID=31901)	N909154-04			0.041	0.500			62		1085			20	10/09/99	10/10	SS-015
Nominal values and limits from method				1.0	0.500			20-105		10	100		180			

PROCEDURES	REFERENCE	PUPLATE
	EP-060	Soil Preparation, rev 0
	EP-070	Soil Dissolution, rev 0
	EP-940	Plutonium Purification, rev 0
	EP-008	Heavy Elements Electroplating, rev 0

AVERAGES ± 2 SD FOR 4 SAMPLES
MDA 0.038 ± 0.014
YIELD 70 ± 21

Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-CMS
Version 3.06
Report date 10/18/99

TMA/RICHMOND

SAMPLE DELIVERY GROUP H0538

METHOD SUMMARY

URANIUM, ISOTOPIC IN SOIL

ALPHA SPECTROSCOPY

Test U Matrix SOLID
SDG 7215
Contact Kevin C. Johnson

Client Hanford
Contract TRB-SBB-207925
Case no SDG H0538

RESULTS

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST	SUF-FIX	PLANCHET	1: Uranium 233/234	2: Uranium 235	3: Uranium 238	RESULT RATIOS (%) 1+3	2σ	2+3	2σ
Preparation batch 6904-023											
B0WCH8	N909154-01			7215-001	0.324 J	U	0.333 J	97	46	20	15
BLK (QC ID=31900)	N909154-03			7215-003	U	U	U				
LCS (QC ID=31899)	N909154-02			7215-002	ok	ok	ok				
Duplicate (N909154-01)	N909154-04			7215-004	ok J	- U	ok J	122	55	3	6
Nominal values and limits from method				RDLs (pCi/g)	1.0	1.0	1.0	100		4	
105-DR FSB-Soil							Averages	110		12	

METHOD PERFORMANCE

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST	SUF-FIX	MAX MDA pCi/g	ALIQ g	PREP FAC	DILU-TION	YIELD %	EFF %	COUNT min	FWHM keV	DRIFT KeV	DAYS HELD	PREPARED	ANAL-YZED	DETECTOR
Preparation batch 6904-023 2σ prep error 5.0 % Reference Lab Notebook 6904 pg. 023																
B0WCH8	N909154-01			0.086	1.00			81		151			25	10/13/99	10/15	SS-029
BLK (QC ID=31900)	N909154-03			0.025	1.00			82		686				10/13/99	10/14	SS-050
LCS (QC ID=31899)	N909154-02			0.31	1.00			74		155				10/13/99	10/14	SS-027
Duplicate (N909154-01) (QC ID=31901)	N909154-04			0.079	1.00			85		155			24	10/13/99	10/14	SS-029
Nominal values and limits from method				1.0	1.00			30-105		150	100		180			

PROCEDURES	REFERENCE	UPLATE
	EP-060	Soil Preparation, rev 0
	EP-070	Soil Dissolution, rev 0
	EP-910	Uranium Purification, rev 0
	EP-008	Heavy Elements Electroplating, rev 0

AVERAGES ± 2 SD FOR 4 SAMPLES
MDA 0.12 ± 0.25
YIELD 80 ± 9

Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-CMS
Version 3.06
Report date 10/18/99

TMA/RICHMOND

SAMPLE DELIVERY GROUP H0538

METHOD SUMMARY

TECHNETIUM 99 IN SOIL

BETA COUNTING

Test TC Matrix SOLID
SDG 7215
Contact Kevin C. Johnson

Client Hanford
Contract TRB-SBB-207925
Case no SDG H0538

RESULTS

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST	SUF- FIX	PLANCHET	Technetium 99
Preparation batch 6904-023					
B0WCH8	N909154-01			7215-001	U
BLK (QC ID=31900)	N909154-03			7215-003	0.478 J
LCS (QC ID=31899)	N909154-02			7215-002	ok
Duplicate (N909154-01)	N909154-04			7215-004	- U
Nominal values and limits from method				RDLs (pCi/g)	15
105-DR FSB-Soil					

METHOD PERFORMANCE

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST	SUF- FIX	MDA pCi/g	ALIQ g	PREP FAC	DILU- TION	YIELD %	EFF %	COUNT min	FWHM keV	DRIFT KeV	DAYS HELD	PREPARED	ANAL- YZED	DETECTOR
Preparation batch 6904-023	2σ prep error 10.0 %			Reference Lab Notebook 6904 pg. 023												
B0WCH8	N909154-01			0.54	1.00			67	101				21	10/07/99	10/11	GRB-223
BLK (QC ID=31900)	N909154-03			0.40	1.00			87	101					10/07/99	10/12	GRB-228
LCS (QC ID=31899)	N909154-02			0.58	1.00			58	101					10/07/99	10/11	GRB-224
Duplicate (N909154-01) (QC ID=31901)	N909154-04			0.38	1.03			88	101				22	10/07/99	10/12	GRB-203
Nominal values and limits from method				15	1.00			20-105	50				180			

PROCEDURES	REFERENCE	TC99TRLSC
	EP-060	Soil Preparation, rev 0
	EP-020	Sample Leach For Technetium-99, rev 0
	EP-540	Technetium-99 Purification, rev 0

AVERAGES ± 2 SD FOR 4 SAMPLES
MDA 0.48 ± 0.20
YIELD 75 ± 30

Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-CMS
Version 3.06
Report date 10/18/99

TMA/RICHMOND

SAMPLE DELIVERY GROUP H0538

METHOD SUMMARY

GAMMA SCAN

GAMMA SPECTROSCOPY

Test GAM Matrix SOLID
SDG 7215
Contact Kevin C. Johnson

Client Hanford
Contract TRB-SBB-207925
Case no SDG H0538

RESULTS

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST	SUF-FIX	PLANCHET	Cobalt 60	Cesium 137
Preparation batch 6904-023						
B0WCH8	N909154-01			7215-001	U	1.96
BLK (QC ID=31900)	N909154-03			7215-003	U	U
LCS (QC ID=31899)	N909154-02			7215-002	ok	ok
Duplicate (N909154-01)	N909154-04			7215-004	- U	ok
Nominal values and limits from method 105-DR FSB-Soil				RDLs (pCi/g)	0.050	0.10

METHOD PERFORMANCE

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST	SUF-FIX	MAX MDA pCi/g	ALIQ g	PREP FAC	DILU-TION	YIELD %	EFF %	COUNT min	FWHM keV	DRIFT KeV	DAYS HELD	PREPARED	ANAL-YZED	DETECTOR
Preparation batch 6904-023 2σ prep error 15.0 % Reference Lab Notebook 6904 pg. 023																
B0WCH8	N909154-01			0.12	157					424			10	09/27/99	09/30	JR,07,00
BLK (QC ID=31900)	N909154-03			0.030	157					672				09/27/99	10/01	JR,04,00
LCS (QC ID=31899)	N909154-02			0.036	157					423				09/27/99	10/01	JR,04,00
Duplicate (N909154-01) (QC ID=31901)	N909154-04			0.090	157					671			11	09/27/99	10/01	JR,07,00
Nominal values and limits from method				0.050	157					100			180			

PROCEDURES	REFERENCE	GAMMAHI
	EP-060	Soil Preparation, rev 0
	EP-100	Ge(Li) Preparation for Environmental Samples, rev 0

AVERAGES ± 2 SD FOR 4 SAMPLES
MDA 0.069 ± 0.087
YIELD _____ ± _____

Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-CMS
Version 3.06
Report date 10/18/99

TMA/RICHMOND

SAMPLE DELIVERY GROUP H0538

METHOD SUMMARY

CARBON 14 IN SOIL

LIQUID SCINTILLATION COUNTING

Test C Matrix SOLID
SDG 7215
Contact Kevin C. Johnson

Client Hanford
Contract TRB-SBB-207925
Case no SDG H0538

RESULTS

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST	SUF-FIX	PLANCHET	Carbon 14	
Preparation batch 6904-023						
B0WCH8	N909154-01			7215-001	6.91	J
BLK (QC ID=31900)	N909154-03			7215-003	U	
LCS (QC ID=31899)	N909154-02			7215-002	ok	
Duplicate (N909154-01)	N909154-04			7215-004	ok	J
Nominal values and limits from method 105-DR FSB-Soil				RDLs (pCi/g)	50	

METHOD PERFORMANCE

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST	SUF-FIX	MDA pCi/g	ALIQ g	PREP FAC	DILU-TION	YIELD %	EFF %	COUNT min	FWHM keV	DRIFT KeV	DAYS HELD	PREPARED	ANAL-YZED	DETECTOR
Preparation batch 6904-023 2σ prep error 10.0 % Reference Lab Notebook 6904 pg. 023																
B0WCH8	N909154-01			5.0	0.215			100	100				19	10/06/99	10/09	LSC-004
BLK (QC ID=31900)	N909154-03			4.5	0.214			100	100					10/06/99	10/09	LSC-004
LCS (QC ID=31899)	N909154-02			28	0.214			100	3					10/06/99	10/10	LSC-004
Duplicate (N909154-01) (QC ID=31901)	N909154-04			5.0	0.202			100	100				19	10/06/99	10/09	LSC-004
Nominal values and limits from method				50	0.208					25			180			

PROCEDURES	REFERENCE	
	C14COXLSC	
	EP-060	Soil Preparation, rev 0
	EP-251	Tritium / Carbon-14 Oxidation, rev 0

AVERAGES ± 2 SD FOR 4 SAMPLES
MDA 11 ± 23
YIELD 100 ± 0

Lab id TMANC
Protocol Hanford
Version Ver 1.0
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Version 3.06
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TMA/RICHMOND

SAMPLE DELIVERY GROUP H0538

METHOD SUMMARY

NICKEL 63 IN SOIL

LIQUID SCINTILLATION COUNTING

Test NI L Matrix SOLID
SDG 7215
Contact Kevin C. Johnson

Client Hanford
Contract TRB-SBB-207925
Case no SDG H0538

RESULTS

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST	SUF-FIX	PLANCHET	Nickel 63	
Preparation batch 6904-023						
B0WCH8	N909154-01			7215-001	U	
BLK (QC ID=31900)	N909154-03			7215-003	U	
LCS (QC ID=31899)	N909154-02			7215-002	ok	
Duplicate (N909154-01)	N909154-04			7215-004	-	U
Nominal values and limits from method				RDLs (pCi/g)	30	
105-DR FSB-Soil						

METHOD PERFORMANCE

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST	SUF-FIX	MDA pCi/g	ALIQ g	PREP FAC	DILU-TION	YIELD %	EFF %	COUNT min	FWHM keV	DRIFT KeV	DAYS HELD	PREPARED	ANAL-YZED	DETECTOR
Preparation batch 6904-023	2σ prep error 10.0 %			Reference Lab Notebook 6904 pg. 023												
B0WCH8	N909154-01			2.3	0.500			74	100				21	10/09/99	10/11	LSC-005
BLK (QC ID=31900)	N909154-03			2.1	0.500			85	100					10/09/99	10/11	LSC-005
LCS (QC ID=31899)	N909154-02			1.9	0.500			89	100					10/09/99	10/11	LSC-005
Duplicate (N909154-01) (QC ID=31901)	N909154-04			2.1	0.500			84	100				21	10/09/99	10/11	LSC-005
Nominal values and limits from method				30	0.500					10			180			

PROCEDURES	REFERENCE	
	NI63LSC	
	EP-060	Soil Preparation, rev 0
	EP-431	Nickel-63 Purification, rev 0

AVERAGES ± 2 SD FOR 4 SAMPLES			
	MDA	2.1	± 0.33
	YIELD	83	± 13

Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-CMS
Version 3.06
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SDG 7215
Contact Kevin C. Johnson

REPORT GUIDE

Client Hanford
Contract TRB-SBB-207925
Case no SDG H0538

SAMPLE SUMMARY

The Sample and QC Summary Reports show all samples, including QC samples, reported in one Sample Delivery Group (SDG).

The Sample Summary Report fully identifies client samples and gives the corresponding lab sample identification. The QC Summary Report shows at the sample level how the lab organized the samples into batches and generated QC samples. The Preparation Batch and Method Summary Reports show this at the analysis level.

The following notes apply to these reports:

* LAB SAMPLE ID is the lab's primary identification for a sample.

* DEPARTMENT SAMPLE ID is an alternate lab id, for example one assigned by a radiochemistry department in a lab.

* CLIENT SAMPLE ID is the client's primary identification for a sample. It includes any sample preparation done by the client that is necessary to identify the sample.

* QC BATCH is a lab assigned code that groups samples to be processed and QCed together. These samples should have similar matrices.

  QC BATCH is not necessarily the same as SDG, which reflects samples received and reported together.

* All Lab Control Samples, Method Blanks, Duplicates and Matrix Spikes are shown that QC any of the samples. Due to possible reanalyses, not all results for all these QC samples may be relevant to the SDG. The Lab Control Sample, Method Blank, Duplicate, Matrix Spike and Method Summary Reports detail these relationships.

Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-RG
Version 3.06
Report date 10/18/99

SDG 7215
Contact Kevin C. Johnson

REPORT GUIDE

Client Hanford
Contract TRB-SBB-207925
Case no SDG H0538

PREPARATION BATCH SUMMARY

The Preparation Batch Summary Report shows all preparation batches in one Sample Delivery Group (SDG) with information necessary to check the completeness and consistency of the SDG.

The following notes apply to this report:

* The preparation batches are shown in the same order as the Method Summary Reports are printed.

* Only analyses of planchets relevant to the SDG are included.

* Each preparation batch should have at least one Method Blank and LCS in it to validate client sample results.

* The QUALIFIERS shown are all qualifiers other than U, J, B, L and H that occur on any analysis in the preparation batch. The Method Summary Report has these qualifiers on a per sample basis.

  These qualifiers should be reviewed as follows:

  X Some data has been manually entered or modified. Transcription errors are possible.

  P One or more results are 'preliminary'. The data is not ready for final reporting.

  2 There were two or more results for one analyte on one planchet imported at one time. The results in DVD may not be the same as on the raw data sheets.

  Other lab defined qualifiers may occur. In general, these should be addressed in the SDG narrative.

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Form DVD-RG
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SDG 7215
Contact Kevin C. Johnson

REPORT GUIDE

Client Hanford
Contract TRB-SBB-207925
Case no SDG H0538

WORK SUMMARY

The Work Summary Report shows all samples, including QC samples, and all relevant analyses in one Sample Delivery Group (SDG). This report is often useful as supporting documentation for an invoice.

The following notes apply to this report:

* TEST is a code for the method used to measure associated analytes. Results and related information for each analyte are on the Data Sheet Report. In special cases, a test code used in the summary data section is not the same as in associated raw data. In this case, both codes are shown on the Work Summary.

* SUFFIX is the lab's code to distinguish multiple analyses (recounts, reworks, reanalyses) of a fraction of the sample. The suffix indicates which result is being reported. An empty suffix normally identifies the first attempt to analyze the sample.

* The LAB SAMPLE ID, TEST and SUFFIX uniquely identify all supporting data for a result. The Method Summary Report for each TEST has method performance data, such as yield, for each lab sample id and suffix and procedures used in the method.

* PLANCHET is an alternate lab identifier for work done for one test. It, combined with the TEST and SUFFIX, may be the best link to raw data.

* For QC samples, only analyses that directly QC some regular sample are shown. The Lab Control Sample, Method Blank, Duplicate, Matrix Spike and Method Summary Reports detail these relationships.

* The SAS (Special Analytical Services) Number is a client or lab assigned code that reflects special processing for samples, such as rapid turn around. Counts of tests done are lists by SAS number since it is likely to affect prices.

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Contact Kevin C. Johnson

REPORT GUIDE

Client Hanford
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DATA SHEET

The Data Sheet Report shows all results and primary supporting information for one client sample or Method Blank. This report corresponds to both the CLP Inorganics and Organics Data Sheet.

The following notes apply to this report:

* TEST is a code for the method used to measure an analyte. If the TEST is empty, no data is available; the analyte was not analyzed for.

* The LAB SAMPLE ID and TEST uniquely identify work within the Summary Data Section of a Data Package. The Work Summary and Method Summary Reports further identify raw data that underlies this work.

  The Method Summary Report for each TEST has method performance data, such as yield, for each Lab Sample ID and a list of procedures used in the method.

* ERRORs can be labeled TOTAL or COUNT. TOTAL implies a preparation (non-counting method) error has been added, as square root of sum of squares, to the counting error denoted by COUNT. The preparation errors, which may vary by preparation batch, are shown on the Method Summary Report.

* A RESULT can be 'N.R.' (Not Reported). This means the lab did this work but chooses not to report it now, possibly because it was reported at another time.

* When reporting a Method Blank, a RESULT can be 'N.A.' (Not Applicable). This means there is no reported client sample work in the same preparation batch as the Blank's result. This is likely to occur when the Method Blank is associated with reanalyses of selected work for a few samples in the SDG.

The following qualifiers are defined by the DVD system:

U The RESULT is less than the MDA (Minimum Detectable Activity).

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GUIDE, cont.

Client Hanford
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DATA SHEET

If the MDA is blank, the ERROR is used as the limit.

J The RESULT is less than the RDL (Required Detection Limit) and no U qualifier is assigned.

B A Method Blank associated with this sample had a result without a U flag and, after correcting for possibly different aliquots, that result is greater than or equal to the MDA for this sample.

Normally, B is not assigned if U is. When method blank subtraction is shown on this report, B flags are assigned based on the unsubtracted values while U's are assigned based on the subtracted ones. Both flags can be assigned in this case.

For each sample result, all Method Blank results in the same preparation batch are compared. The Method Summary Report documents this and other QC relationships.

L Some Lab Control Sample that QC's this sample had a low recovery. The lab can disable assignment of this qualifier.

H Similar to 'L' except the recovery was high.

P The RESULT is 'preliminary'.

X Some data necessary to compute the RESULT, ERROR or MDA was manually entered or modified.

2 There were two or more results available for this analyte. The reported result may not be the same as in the raw data.

Other qualifiers are lab defined. Definitions should be in the SDG narrative.

The following values are underlined to indicate possible problems:

* An MDA is underlined if it is bigger than its RDL.

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GUIDE, cont.

Client Hanford
Contract TRB-SBB-207925
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DATA SHEET

* An ERROR is underlined if the 1.645 sigma counting error is bigger than both the MDA and the RESULT, implying that the MDA may not be a good estimate of the 'real' minimum detectable activity.

* A negative RESULT is underlined if it is less than the negative of its 2 sigma counting ERROR.

* When reporting a Method Blank, a RESULT is underlined if greater than its MDA. If the MDA is blank, the 2 sigma counting error is used in the comparison.

Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-RG
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SDG 7215
Contact Kevin C. Johnson

REPORT GUIDE

Client Hanford
Contract TRB-SBB-207925
Case no SDG H0538

LAB CONTROL SAMPLE

The Lab Control Sample Report shows all results, recoveries and primary supporting information for one Lab Control Sample.

The following notes apply to this report:

* All fields in common with the Data Sheet Report have similar usage. Refer to its Report Guide for details.

* An amount ADDED is the lab's value for the actual amount spiked into this sample with its ERROR an estimate of the error of this amount.

  An amount added is underlined if its ratio to the corresponding RDL is outside protocol specified limits.

* REC (Recovery) is RESULT divided by ADDED expressed as a percent.

* The first, computed limits for the recovery reflect:

  1. The error of RESULT, including that introduced by rounding the result prior to printing.

     If the limits are labeled (TOTAL), they include preparation error in the result. If labeled (COUNT), they do not.

  2. The error of ADDED.

  3. A lab specified, per analyte bias. The bias changes the center of the computed limits.

* The second limits are protocol defined upper and lower QC limits for the recovery.

* The recovery is underlined if it is outside either of these ranges.

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Protocol Hanford
Version Ver 1.0
Form DVD-RG
Version 3.06
Report date 10/18/99

SDG 7215
Contact Kevin C. Johnson

REPORT GUIDE

Client Hanford
Contract TRB-SBB-207925
Case no SDG H0538

DUPLICATE

The Duplicate Report shows all results, differences and primary supporting information for one Duplicate and associated Original sample.

The following notes apply to this report:

* All fields in common with the Data Sheet Report have similar usage. This applies both to the Duplicate and Original sample data. Refer to the Data Sheet Report Guide for details.

  If the Duplicate has data for a TEST and the lab did not do this test to the Original, the Original's RESULTs are underlined.

* The RPD (Relative Percent Difference) is the absolute value of the difference of the RESULTs divided by their average expressed as a percent.

  If both RESULTs are less than their MDAs, no RPD is computed and a '-' is printed.

  For an analyte, if the lab did work for both samples but has data for only one, the MDA from the sample with data is used as the other's result in the RPD.

* The first, computed limit is the sum, as square root of sum of squares, of the errors of the results divided by the average result as a percent, hence the relative error of the difference rather than the error of the relative difference. The errors include those introduced by rounding the RESULTs prior to printing.

  If this limit is labeled TOT, it includes the preparation error in the RESULTs. If labeled CNT, it does not.

  This value reported for this limit is at most 999.

* The second limit for the RPD is the larger of:

  1. A fixed percentage specified in the protocol.

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DUPLICATE

2. A protocol factor (typically 2) times the average MDA as a percent of the average result. This limit applies when the results are close to the MDAs.

* The RPD is underlined if it is greater than either limit.

* If specified by the lab, the second limit column is replaced by the Difference Error Ratio (DER), which is the absolute value of the difference of the results divided by the quadratic sum of their one sigma errors, the same errors as used in the first limit.

  Except for differences due to rounding, the DER is the same as the RPD divided by the first RPD limit with the limit scaled to 1 sigma.

* The DER is underlined if it is greater than the sigma factor, typically 2 or 3, shown in the header for the first RPD limit.

SDG 7215
Contact Kevin C. Johnson

REPORT GUIDE

Client Hanford
Contract TRB-SBB-207925
Case no SDG H0538

MATRIX SPIKE

The Matrix Spike Report shows all results, recoveries and primary supporting information for one Matrix Spike and associated Original sample.

The following notes apply to this report:

* All fields in common with the Data Sheet Report have similar usage. This applies both to the Spiked and Original sample data. Refer to the Data Sheet Report Guide for details.

  If the Spike has data for a TEST and the lab did not do this test to the Original, the Original's RESULTs are underlined.

* An amount ADDED is the lab's value for the actual amount spiked into the Spike sample with its ERROR an estimate of the error of this amount.

  An amount is underlined if its ratio to the corresponding RDL is outside protocol specified limits.

* REC (Recovery) is the Spike RESULT minus the Original RESULT divided by ADDED expressed as a percent.

* The first, computed limits for the recovery reflect:

  1. The errors of the two RESULTs, including those introduced by rounding them prior to printing.

     If the limits are labeled (TOTAL), they include preparation error in the result. If labeled (COUNT), they do not.

  2. The error of ADDED.

  3. A lab specified, per analyte bias. The bias changes the center of the computed limits.

* The second limits are protocol defined upper and lower QC limits

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SDG 7215
Contact Kevin C. Johnson

GUIDE, cont.

Client Hanford
Contract TRB-SBB-207925
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MATRIX SPIKE

for the recovery.

These limits are left blank if the Original RESULT is more than a protocol defined factor (typically 4) times ADDED. This is a way of accounting for that when the spike is small compared to the amount in the original sample, the recovery is unreliable.

* The recovery is underlined (out of spec) if it is outside either of these ranges.

Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-RG
Version 3.06
Report date 10/18/99

SDG 7215
Contact Kevin C. Johnson

REPORT GUIDE

Client Hanford
Contract TRB-SBB-207925
Case no SDG_H0538

METHOD SUMMARY

The Method Summary Report has two tables. One shows up to five results measured using one method. The other has performance data for the method. There is one report for each TEST, as used on the Data Sheet Report.

The following notes apply to this report:

* Each table is subdivided into sections, one for each preparation batch. A preparation batch is a group of aliquots prepared at roughly the same time in one work area of the lab using the same method.

  There should be Lab Control Sample and Method Blank results in each preparation batch since this close correspondence makes the QC meaningful. Depending on lab policy, Duplicates need not occur in each batch since they QC sample dependencies such as matrix effects.

* The RAW TEST column shows the test code used in the raw data to identify a particular analysis if it is different than the test code in the header of the report. This occurs in special cases due to method specific details about how the lab labels work.

  The Lab Sample or Planchet ID combined with the (Raw) Test Code and Suffix uniquely identify the raw data for each analysis.

* If a result is less than both its MDA and RDL, it is replaced by just 'U' on this report. If it is greater than or equal to the RDL but less than the MDA, the result is shown with a 'U' flag.

  The J and X flags are as on the data sheet.

* Non-U results for Method Blanks are underlined to indicate possible contamination of other samples in the preparation batch. The Method Blank Report has supporting data.

* Lab Control Sample and Matrix Spike results are shown as: ok, No data, LOW or HIGH, with the last two underlined. 'No data'

Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-RG
Version 3.06
Report date 10/18/99

METHOD SUMMARY

means no amount ADDED was specified. 'LOW' and 'HIGH' correspond to when the recovery is underlined on the Lab Control Sample or Matrix Spike Report. See these reports for supporting data.

* Duplicate sample results are shown as: ok, No data, or OUT, with the last two underlined. 'No data' means there was no original sample data found for this duplicate. 'OUT' corresponds to when the RPD is underlined on the Duplicate Report. See this report for supporting data.

* If the MDA column is labeled 'MAX MDA', there was more than one result measured by the reported method and the MDA shown is the largest MDA. If not all these results have the same RDL, the MAX MDA reflects only those results with RDL equal to the smallest one.

  MDAs are underlined if greater than the printed RDL.

* Aliquots are underlined if less than the nominal value specified for the method.

* Prepareation factors are underlined if greater than the nominal value specified for the method.

* Dilution factors are underlined if greater than the nominal value specified for the method.

* Residues are underlined if outside the range specified for the method. Residues are not printed if yields are.

* Yields, which may be gravimetric, radiometric or some type of recovery depending on the method, are underlined if outside the range specified for the method.

* Efficiencies are underlined if outside the range specified for the method. Efficiencies are detector and geometry dependent so this test is only approximate.

SDG 7215
Contact Kevin C. Johnson

Client Hanford
Contract TRB-SBB-207925
Case no SDG H0538

METHOD SUMMARY

* Count times are underlined if less than the nominal value specified for the method.

* Resolutions (as FWHM; Full Width at Half Max) are underlined if greater than the method specified limit.

* Tracer drifts are underlined if their absolute values are greater than the method specified limit. Tracer drifts are not printed if percent moistures are.

* Days Held are underlined if greater than the holding time specified in the protocol.

* Analysis dates are underlined if before their planchet's preparation date or, if a limit is specified, too far after it.

For some methods, ratios as percentages and error estimates for them are computed for pairs of results. A ratio column header like '1÷3' means the ratio of the first result column and the third result column.

Ratios are not computed for Lab Control Sample, Method Blank or Matrix Spike results since their matrices are not necessarily similar to client samples'.

The error estimate for a ratio of results from one planchet reflects only counting errors since other errors should be correlated. For a ratio involving different planchets, if QC limits are computed based on total errors, the error for the ratio allows for the preparation errors for the planchets.

The ratio is underlined (out of spec) if the absolute value of its difference from the nominal value is greater than its error estimate. If no nominal value is specified, this test is not done.

For Gross Alpha or Gross Beta results, there may be a column showing the sum of other Alpha or Beta emitters. This sum includes all relevant

Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-RG
Version 3.06
Report date 10/18/99

SDG 7215
Contact Kevin C. Johnson

Client Hanford
Contract TRB-SBB-207925
Case no SDG_H0538

METHOD SUMMARY

results in the DVD database, whether reported or not. Results in the sum are weighted by a particles/decay value specified by the lab for each relevant analyte. Results less than their MDA are not included. No sums are computed for Lab Control, Method Blank or Matrix Spike samples since their various planchets may not be physically related.

If a ratio of total isotopic to Gross Alpha or Beta is shown, the error for the ratio reflects both the error in the Gross result and the sum, as square root of sum of squares, of the errors in the isotopic results.

For total elemental uranium or thorium results, there may be a column showing the total weight computed from associated isotopic results. Ignoring results less than their MDAs, this is a weighted sum of the isotopic results. The weights depend on the molecular weight and half-life of each isotope so as to convert activities (decays) to weight (atoms).

If a ratio of total computed to measured elemental uranium or thorium is shown, the error for the ratio reflects the errors in all the measurements.

Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-RG
Version 3.06
Report date 10/18/99

Thermo NUtech - Richmond

SAMPLE RECEIPT CHECKLIST

SAMPLE RECEIPT

Client: Bechtel Hanford Inc Date/Time received 9-22-99 10:00

CoC No. B99-075-16

Container I.D. No. _____ Requested TAT (Days) 21 P.O. Received Yes [ ] No [✓]

INSPECTION

1. Custody seals on shipping container intact? Yes [✓] No [ ] N/A [ ]
2. Custody seals on shipping container dated & signed? Yes [✓] No [ ] N/A [ ]
3. Custody seals on sample containers intact? Yes [✓] No [ ] N/A [ ]
4. Custody seals on sample containers dated & signed? Yes [✓] No [ ] N/A [ ]
5. Cooler Temperature: _____ Packing material is: Wet [ ] Dry [✓]
6. Number of samples in shipping container: 1
7. Number of containers per sample: 1 (Or see CoC _____)
8. Paperwork agrees with samples? Yes [✓] No [ ]
9. Samples have: Tape [ ] Hazard labels [ ] Rad labels [✓] Appropriate sample labels [✓]
10. Samples are: In good condition [✓] Leaking [ ] Broken Container [ ] Missing [ ]
11. Describe any anomalies: _____

13. Was P.M. notified of any anomalies? Yes [ ] No [ ] Date _____
14. Received by M. Goldenberg Date: 9-22-99 Time: 10:00

LOGIN

TNU W.O. No. _____ Group No. _____ Client W.O. No. _____

PROGRAM MANAGER

Sample holding times exceeded? Yes [ ] No [ ]

Client Notified: Name _____ Date/time _____

Bechtel Hanford Inc.		CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	B99-075-16	Page 1 of 1

Collector Fahlberg/Behnke	Company Contact Jason Adler	Telephone No. 373-4316	Project Coordinator TRENT, SJ	Price Code 8L Data Turnaround 21 Days
Project Designation 105-DR FSB - Soil	Sampling Location 105 DR		SAF No. B99-075	
Ice Chest No. ERC 99-009	Field Logbook No. EL-1281		Method of Shipment FEDEX	
Shipped To TMA/~~RECRA~~ RF 9.20.99	Offsite Property No. A 990262		Bill of Lading/Air Bill No. 4235 7952 9620	
			COA R105P4 2800	

POSSIBLE SAMPLE HAZARDS/REMARKS	Preservation	Cool 4C	Cool 4C	None	None						
	Type of Container	aG	aG	aG	aG						
Special Handling and/or Storage	No. of Container(s) Volume	1 60mL	1 60mL	1 60mL	1 500mL						
SAMPLE ANALYSIS		Chromium Hex - 7196	PCBs - 8080 (Aroclor-1254)	ICP Metals - 6010A (Add-on) (Lead); Mercury - 7471 - (CV)	See item (1) in Special Instructions.						

Sample No.	Matrix *	Sample Date	Sample Time									
B0WCH8	Soil	9.20.99	0900				X					B0W CC8

CHAIN OF POSSESSION	Sign/Print Names	Date/Time
Relinquished By	R. Fahlberg/R. Fahlberg	9.20.99 1335
Received By	Ref 1-C	9.20.99 1335
Relinquished By	Ref 1-C	9.21.99 0930
Received By	C Juice	9.21.99 0930
Relinquished By	C Juice	9.21.99 1400
Received By	FEDEX	9.21.99 1400
Relinquished By	FedEx	9-22-99 10:00
Received By	TNV M. Goldenberg	9-22-99 10:00

SPECIAL INSTRUCTIONS

(1) Gamma Spectroscopy (Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155); Gamma Spec - Add-on (Barium-133); Isotopic Plutonium; Isotopic Uranium; Americium-241; Carbon-14; Nickel-63; Technetium-99

COLLECTOR UNAVAILABLE TO SIGN COC

Matrix *
- Soil
- Water
- Vapor
- Other Solid
- Other Liquid

LABORATORY SECTION	Received By	Title	Date/Time
FINAL SAMPLE DISPOSITION	Disposal Method	Disposed By	Date/Time

RECRA ENVIRONMENTAL INC.
Chemical and Environmental Measurement Information

Recra LabNet Philadelphia
Analytical Report

Client: TNU-HANFORD B99-075
RFW#: 9909L156
SDG/SAF#: H0538/B99-075

W.O.#: 10985-001-001-9999-00
Date Received: 09-22-99

PCB

One (1) solid sample was collected on 09-20-99.

The sample and its associated QC samples were extracted on 09-28-99 and analyzed according to Recra OPs based on SW846, 3rd Edition procedures on 10-02,03-99. The extraction procedure was based on method 3540 and the extracts were analyzed based on method 8082 for Aroclors only.

The following is a summary of the QC results accompanying the sample results and a description of any problems encountered during their analyses:

1. The cooler temperature has been recorded on the chain-of-custody.
2. All required holding times for extraction and analysis have been met.
3. The sample and its associated QC samples received a sulfuric acid and sulfur cleanup.
4. The method blank was below the reporting limits for all target compounds.
5. All surrogate recoveries were within acceptance criteria.
6. The blank spike recovery was within acceptance criteria.
7. Due to insufficient sample volume, matrix spike QC could not be performed on any samples in this data set. However, blank spike QC were performed with these samples to demonstrate that systems were in control.
8. All initial calibrations associated with this data set were within acceptance criteria.
9. All continuing calibration standards analyzed prior to sample extracts were within acceptance criteria.

for J. Michael Taylor
Vice President
Philadelphia Analytical Laboratory

10-15-99
Date

pef\r:\group\data\pest\09L-156.pcb

208 Welsh Pool Road • Lionville, PA 19341-1333 • (610) 280-3000 • Fax (610) 280-3041

GLOSSARY OF PESTICIDE/PCB DATA

DATA QUALIFIERS

U = Indicates that the compound was analyzed for but not detected. The minimum detection limit for the sample (not the method detection limit) is reported with the U (e.g., 10U).

J = Indicates an estimated value. This flag is used in cases where a target analyte is detected at a level less than the lower quantification level. If the limit of quantification is 10 ug/L and a concentration of 3 ug/L is calculated, it is reported as 3J.

B = This flag is used when the analyte is found in the associated blank as well as in the sample. It indicates possible/probable blank contamination.

E = Indicates that the compound was detected beyond the calibration range and was subsequently analyzed at a dilution.

I = Interference.

ABBREVIATIONS

BS = Indicates blank spike in which reagent grade water is spiked with the CLP matrix spiking solutions and carried through all the steps in the method. Spike recoveries are reported.

BSD = Indicates blank spike duplicate.

MS = Indicates matrix spike.

MSD = Indicates matrix spike duplicate.

DL = Indicates that recoveries were not obtained because the extract had to be diluted for analysis.

NA = Not Applicable.

DF = Dilution Factor.

NR = Not Required.

SP = Indicates Spiked Compound.

GLOSSARY OF PESTICIDE/PCB DATA

P = This flag is used for a pesticide/Aroclor target analyte when there is greater than 25% difference for detected concentrations between the two GC columns (see Form X). The lower of the two values is reported on Form I and flagged with a "P".

D = This flag identifies all compounds identified in an analysis at a secondary dilution factor.

C = This flag applies to a compound that has been confirmed by GC/MS.

Recra LabNet Philadelphia Sample Discrepancy Report (SDR) SDR #: 99EX083

Initiator: Bernard Foley RFW Batch: 9909U156 Parameter: OR3
Date: 9/28/99 Samples: 1 Matrix: S
Client: TVU Method: SW846/MCAWW/CLP/ Prep Batch: 99LE1173
ID 538

1. Reason for SDR

a. COC Discrepancy __ Tech Profile Error __ Client Request __ Sampler Error on C-O-C __ Transcription Error __ Wrong Test Code __ Other _____

b. General Discrepancy

__ Missing Sample/Extract __ Container Broken __ Wrong Sample Pulled __ Label ID's Illegible
__ Hold Time Exceeded __ Insufficient Sample __ Preservation Wrong __ Received Past Hold
__ Improper Bottle Type __ Not Amenable to Analysis

Note: Verified by [Log-In] or [Prep Group] (circle)...signature/date: _____

c. QC Problem (Include all relevant specific results; attach data if necessary)

In No ms, msd was done for this sample

2. Known or Probable Causes(s)

Insufficient Volume

3. Discussion and Proposed Action Other Description:

__ Re-log
__ Entire Batch
__ Following Samples: _____
__ Re-leach
__ Re-extract
__ Re-digest
__ Revise EDD
__ Change Test Code to _____
__ Place On/Take Off Hold (circle)

4. Project Manager Instructions...signature/date: Kathleen Johnston 10/8/99

__ Concur with Proposed Action
__ Disagree with Proposed Action; See Instruction
✓ Include in Case Narrative
__ Client Contacted:
Date/Person _____
__ Add
__ Cancel

5. Final Action...signature/date: Kathleen Johnston 10/13/99 Other Explanation:

__ Verified re-[log][leach][extract][digest][analysis] (circle)
✓ Included in Case Narrative
__ Hard Copy COC Revised
__ Electronic COC Revised
__ EDD Corrections Completed

When Final Action has been recorded, forward original to QA Specialist for distribution and filing.

Route	Distribution of Completed SDR	Route	Distribution of Completed SDR
__	X Initiator	__	__ Metals: Doughty
__	X Lab Manager: M. Taylor	__	__ Inorganic: Perrone
1	X Project Mgr: Stone/Carey/Schrenkel/Johnson	2	X GC/LC: Schnell
__	X Section Mgr: Wesson/Daniels	__	__ MS: LeMin/Taylor
__	X QA (file): Racioppi	__	__ Log-in: Toder
__	__ Data Management: Feldman	__	__ Admin: Soos
__	__ Sample Prep: Schnell/Doughty/Kauffman	__	__ Other: _____

Recra LabNet - Lionville Laboratory

PCBs by GC

Report Date: 10/13/99 13:29

RFW Batch Number: **9909L156** Client: **TNU-HANFORD B99-075** Work Order: 10985001001 Page: 1

003

	Cust ID:	B0WCH8	PBLKVJ	PBLKVJ BS
Sample Information	RFW#:	001	99LE1173-MB1	99LE1173-MB1
	Matrix:	SOIL	SOIL	SOIL
	D.F.:	1.00	1.00	1.00
	Units:	UG/KG	UG/KG	UG/KG
Surrogate: Tetrachloro-m-xylene		98 %	110 %	108 %
Decachlorobiphenyl		94 %	103 %	104 %
Aroclor-1254		35 U	33 U	87 %

10-13-99

U= Analyzed, not detected. J= Present below detection limit. B= Present in blank. NR= Not reported. NS= Not spiked.
%= Percent recovery. D= Diluted out. I= Interference. NA= Not Applicable. *= Outside of EPA CLP QC

Recra LabNet - Lionville Laboratory
PCB ANALYTICAL DATA PACKAGE FOR
TNU-HANFORD B99-075

DATE RECEIVED: 09/22/99 RFW LOT # :9909L156

CLIENT ID	RFW #	MTX	PREP #	COLLECTION	EXTR/PREP	ANALYSIS
B0WCH8	001	S	99LE1173	09/20/99	09/28/99	10/03/99
LAB QC:						
PBLKVJ	MB1	S	99LE1173	N/A	09/28/99	10/02/99
PBLKVJ	MB1 BS	S	99LE1173	N/A	09/28/99	10/02/99

10-13-99

RECRA LabNet Use Only

9909L156

Custody Transfer Record/Lab Work Request

Page 1 of 1

RECRA LabNet

All FIELD PERSONNEL: COMPLETE ONLY SHADED AREAS

(8) PCB

Client TNU-Hanford B99-075

Est. Final Proj. Sampling Date

Project # 10985-001-001-9999-00

Project Contact/Phone #

RECRA Project Manager OJ

QC spec Del std TAT 21 days

Date Rec'd 9-22-99 Date Due 10/13/99

Account #

Refrigerator #				6					6		6				DUP				
#/Type Container	Liquid																		
	Solid			1ag					1ag		1ag								
Volume	Liquid			8															
	Solid			60					60		60								
Preservatives																			
ANALYSES REQUESTED →				ORGANIC					INORG										
				VOA	BNA	~~Pest~~ PCB	Herb		Metal	CN	Hex Chrom								
									RECRA LabNet Use Only										
						8082B			MPBTO MHGTO		ICRC								
001	BOWCH8			S	9/20/99	0900			X		X								

MATRIX CODES:
S - Soil
SE - Sediment
SO - Solid
SL - Sludge
W - Water
O - Oil
A - Air
DS - Drum Solids
DL - Drum Liquids
L - EP/TCLP Leachate
WI - Wipe
X - Other
F - Fish

Special Instructions:

saf # B99-075

COMPOSITE WASTE

DATE/REVISIONS:

1. Run matrix QC
2.
3. PCB = AR1254 only
4.
5.
6.

RECRA LabNet Use Only

Samples were: 1) Shipped ✓ or Hand Delivered ___

Airbill # ✱ ___

2) Ambient or (Chilled)

3) Received In Good Condition (Y) or N

4) Labels Indicate Properly Preserved (Y) or N

5) Received Within Holding Times (Y) or N

COC Tape was: 1) Present on Outer Package (Y) or N; 2) Unbroken on Outer Package (Y) or N; 3) Present on Sample (Y) or N; 4) Unbroken on Sample (Y) or N

COC Record Present Upon Sample Rec't (Y) or N

Cooler Temp. 3.2 °C

Discrepancies Between Samples Labels and COC Record? Y or (N)

NOTES:

✱ 423579529610

Relinquished by	Received by	Date	Time
FedEx	D. Johnson	9/22/99	0945

Relinquished by	Received by	Date	Time
	ORIGINAL		
	REWRITTEN		

Bechtel Hanford Inc.		CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	B99-075-16	Page 1 of 1

Collector Fahlberg/Behnke	Company Contact Jason Adler	Telephone No. 373-4316	Project Coordinator TRENT, SJ
Project Designation 105-DR FSB - Soil	Sampling Location 105 DR		SAF No. B99-075
Ice Chest No. SML 510	Field Logbook No. EL-1281		Method of Shipment FEDEX
Shipped To ~~TMA~~/RECRA RE 9-20-99	Offsite Property No. A990263		Bill of Lading/Air Bill No. CJ 9-21-99 4235 7952 ~~9620~~ 9610
			COA R105D42800

Price Code 8L

Data Turnaround 21 Days

POSSIBLE SAMPLE HAZARDS/REMARKS

Special Handling and/or Storage

Preservation				Cool 4C	Cool 4C	None	None					
Type of Container				aG	aG	aG	aG					
No. of Container(s)				1	1	1	1					
Volume				60mL	60mL	60mL	500mL					
SAMPLE ANALYSIS				Chromium Hex - 7196	PCBs - 8080 {Aroclor-1254}	ICP Metals - 6010A (Add-on) {Lead}; Mercury - 7471 - (CV)	See item (1) in Special Instructions.					
Sample No.	Matrix *	Sample Date	Sample Time									
B0WCH8	Soil	9-20-99	0920	X	X	X					B0W	CC8

CHAIN OF POSSESSION	Sign/Print Names		
Relinquished By	Date/Time 1335	Received By	Date/Time 1335
K. Fahlberg / R. Fahlberg	9-20-99	Ref 1-C	9-20-99
Relinquished By	Date/Time	Received By	Date/Time
Ref 1-C	9-21-99 0930	C. Price	9-21-99 0930
Relinquished By	Date/Time	Received By	Date/Time
C. Price	9-21-99 1400	FEDEX	9-21-99 1400
Relinquished By	Date/Time	Received By	Date/Time
Fed Ex	9-22-99 / 0945	[signature]	9-22-99/0945

SPECIAL INSTRUCTIONS

(1) Gamma Spectroscopy {Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155}; Gamma Spec - Add-on {Barium-133}; Isotopic Plutonium; Isotopic Uranium; Americium-241; Carbon-14; Nickel-63; Technetium-99

COLLECTOR UNAVAILABLE TO SIGN COC

9909L156

Matrix *
- Soil
- Water
- Vapor
- Other Solid
- Other Liquid

LABORATORY SECTION	Received By	Title	Date/Time
FINAL SAMPLE DISPOSITION	Disposal Method	Disposed By	Date/Time

RECRA LabNet
a division of Recra Environmental, Inc.
Virtual Laboratories Everywhere

Recra LabNet Philadelphia
Analytical Report

Client : TNU-HANFORD B99-075
RFW# : 9909L156
SDG/SAF# : H0538/B99-075

W.O.# : 10985-001-001-9999-00
Date Received: 09-22-99

METALS CASE NARRATIVE

1. This narrative covers the analyses of 1 soil sample.

2. The sample was prepared and analyzed in accordance with methods checked on the attached glossary.

3. All analyses were performed within the required holding times.

4. The cooler temperature has been recorded on the Chain of Custody.

5. All Initial and Continuing Calibration Verifications (ICV/CCVs) were within the 90-110% control limits (80-120% for Mercury).

6. All Initial and Continuing Calibration Blanks (ICB/CCBs) were within control limits (less than the PQL).

7. All preparation/method blanks (MB) were within method criteria {less than the Practical Quantitation Limit (3X the IDL) or samples greater than 20X MB value}. Refer to the Inorganics Method Blank Data Summary.

8. All ICP Interference Check Standards were within control limits.

9. All laboratory control samples (LCS) were within the laboratory control limits. Refer to the Inorganics Laboratory Control Standards Report.

10. All matrix spike (MS) recoveries were within the 75-125% control limits. Refer to the Inorganics Accuracy Report.

11. All duplicate analyses were within the 20% Relative Percent Difference (RPD) control limits. Refer to the Inorganics Precision Report.

12. For the purposes of this report, the data has been reported to the Instrument Detection Limit (IDL). Values between the IDL and the Practical Quantitation Limit (PQL) are acquired in a region of less-certain quantification.

for Pat Ez

J. Michael Taylor
Vice President
Philadelphia Analytical Laboratory

10-6-99
Date

mld/m09-156

METALS METHOD GLOSSARY

The following methods are used as reference for the digestion and analysis of samples contained within this Recra Lot#: 9909L156

Leaching Procedure: __1310 __1311 __1312 __Other:_____

CLP Metals __ Digestion and __ Analysis Methods: __ILM03.0 __ILM04.0

Metals Digestion Methods: __3005A __3010A __3015 __3020A ✓3050A __3051 __200.7 __SS17
__Other: _____

Metals Analysis Methods

	SW846	EPA	STD MTD	EPA OSWR	USATHAMA
Aluminum	__6010B	__200.7			__99
Antimony	__6010B __7041 [5]	__200.7 __204.2			__99
Arsenic	__6010B __7060A [5]	__200.7 __206.2	__3113B		__99
Barium	__6010B	__200.7			__99
Beryllium	__6010B	__200.7			__99
Bismuth	__6010B [1]	__200.7 [1]		__1620	__99
Boron	__6010B	__200.7			__99
Cadmium	__6010B __7131A [5]	__200.7 __213.2			__99
Calcium	__6010B	__200.7			__99
Chromium	__6010B __7191 [5]	__200.7 __218.2			__SS17
Cobalt	__6010B	__200.7			__99
Copper	__6010B __7211 [5]	__200.7 __220.2			__99
Iron	__6010B	__200.7			__99
Lead	✓6010B __7421 [5]	__200.7 __239.2	__3113B		__99
Lithium	__6010B __7430 [4]	__200.7		__1620	__99
Magnesium	__6010B	__200.7			__99
Manganese	__6010B	__200.7			__99
Mercury	__7470A [3] ✓7471A [3]	__245.1 [2] __245.5 [2]			__99
Molybdenum	__6010B	__200.7			__99
Nickel	__6010B	__200.7			__99
Potassium	__6010B __7610 [4]	__200.7 __258.1 [4]			__99
Rare Earths	__6010B [1]	__200.7 [1]		__1620	__99
Selenium	__6010B __7740 [5]	__200.7 __270.2	__3113B		__99
Silicon	__6010B [1]	__200.7		__1620	__99
Silica	__6010B	__200.7		__1620	__99
Silver	__6010B __7761 [5]	__200.7 __272.2			__99
Sodium	__6010B __7770 [4]	__200.7 __273.1 [4]			__99
Strontium	__6010B	__200.7			__99
Thallium	__6010B __7841 [5]	__200.7 __279.2 __200.9			__99
Tin	__6010B	__200.7			__99
Titanium	__6010B	__200.7			__99
Uranium	__6010B [1]	__200.7 [1]		__1620	__99
Vanadium	__6010B	__200.7			__99
Zinc	__6010B	__200.7			__99
Zirconium	__6010B [1]	__200.7 [1]		__1620	__99

Other:_____ Method:_____

METHOD REFERENCES AND DATA QUALIFIERS

DATA QUALIFIERS

U = Indicates that the parameter was not detected at or above the reported limit. The associated numerical value is the sample detection limit.

* = Indicates that the original sample result is greater than 4x the spike amount added.

ABBREVIATIONS

MB = Method or Preparation Blank.
MS = Matrix Spike.
MSD = Matrix Spike Duplicate.
REP = Sample Replicate
LCS = Laboratory Control Sample.
NC = Not calculated.

ANALYTICAL METAL METHODS

1. Not included in the method element list.

2. Modified Hg: Hg1 and Hg2 require less total volume of digestate due to the autosampler analysis. Sample volumes and reagents for mercury determinations in water and soil have been proportionately scaled down to adapt to this semi-automated technique. The sample volume used for water analysis is 33 mL. For soils, 0.1 grams of sample is taken to a final volume of 50 mL (including all reagents).

3. Modified Hg: Hg1 and Hg2 require less total volume of digestate due to the autosampler analysis. Sample volumes and reagents for mercury determinations in water and soil have been proportionately scaled down to adapt to this semi-automated technique. The sample volume used for water analysis is 33 mL. For soils, three 0.1 gram of sample is taken to a final volume of 50 mL (including all reagents).

4. Flame AA.

5. Graphite Furnace AA.

Recra LabNet - Lionville

INORGANICS DATA SUMMARY REPORT 10/05/99

CLIENT: TNU-HANFORD B99-075 RECRA LOT #: 9909L156

WORK ORDER: 10985-001-001-9999-00

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT	DILUTION FACTOR
-001	B0WCH8	Mercury, Total	0.02 u	MG/KG	0.02	1.0
		Lead, Total	3.0 u	MG/KG	3.0	1.0

Recra LabNet - Lionville

INORGANICS METHOD BLANK DATA SUMMARY PAGE 10/05/99

CLIENT: TNU-HANFORD B99-075 RECRA LOT #: 9909L156

WORK ORDER: 10985-001-001-9999-00

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT	DILUTION FACTOR
BLANK1	99C0282-MB1	Mercury, Total	0.02 u	MG/KG	0.02	1.0
BLANK1	99L0660-MB1	Lead, Total	3.1 u	MG/KG	3.1	1.0

Recra LabNet - Lionville

INORGANICS ACCURACY REPORT 10/05/99

CLIENT: TNU-HANFORD B99-075 RECRA LOT #: 9909L156

WORK ORDER: 10985-001-001-9999-00

SAMPLE	SITE ID	ANALYTE	SPIKED SAMPLE	INITIAL RESULT	SPIKED AMOUNT	%RECOV	DILUTION FACTOR(SPK)
-001	B0WCH8	Mercury, Total	0.18	0.02u	0.17	103.6	1.0
		Lead, Total	45.1	3.0 u	49.3	91.5	1.0

Recra LabNet - Lionville

INORGANICS PRECISION REPORT 10/05/99

CLIENT: TNU-HANFORD B99-075 RECRA LOT #: 9909L156

WORK ORDER: 10985-001-001-9999-00

SAMPLE	SITE ID	ANALYTE	INITIAL RESULT	REPLICATE	RPD	DILUTION FACTOR(REP)
-001REP	B0WCH8	Mercury, Total	0.02u	0.01u	NC	1.0
		Lead, Total	3.0 u	3.1 u	NC	1.0

Recra LabNet - Lionville

INORGANICS LABORATORY CONTROL STANDARDS REPORT 10/05/99

CLIENT: TNU-HANFORD B99-075 RECRA LOT #: 9909L156

WORK ORDER: 10985-001-001-9999-00

SAMPLE	SITE ID	ANALYTE	SPIKED SAMPLE	SPIKED AMOUNT	UNITS	%RECOV
LCS1	99C0282-LC1	Mercury, LCS	1.0	1.0	MG/KG	105.0
LCS1	99L0660-LC1	Lead, LCS	246	250	MG/KG	98.3

Recra LabNet - Lionville Laboratory
INORGANIC ANALYTICAL DATA PACKAGE FOR
TNU-HANFORD B99-075

DATE RECEIVED: 09/22/99 RFW LOT # :9909L156

CLIENT ID /ANALYSIS	RFW #	MTX	PREP #	COLLECTION	EXTR/PREP	ANALYSIS
B0WCH8						
MERCURY, TOTAL	001	S	99C0282	09/20/99	09/30/99	10/01/99
MERCURY, TOTAL	001 REP	S	99C0282	09/20/99	09/30/99	10/01/99
MERCURY, TOTAL	001 MS	S	99C0282	09/20/99	09/30/99	10/01/99
LEAD, TOTAL	001	S	99L0660	09/20/99	09/29/99	10/01/99
LEAD, TOTAL	001 REP	S	99L0660	09/20/99	09/29/99	10/01/99
LEAD, TOTAL	001 MS	S	99L0660	09/20/99	09/29/99	10/01/99
LAB QC:						
MERCURY LABORATORY	LC1 BS	S	99C0282	N/A	09/30/99	10/01/99
MERCURY, TOTAL	MB1	S	99C0282	N/A	09/30/99	10/01/99
LEAD LABORATORY	LC1 BS	S	99L0660	N/A	09/29/99	10/01/99
LEAD, TOTAL	MB1	S	99L0660	N/A	09/29/99	10/01/99

RECRA LabNet Use Only

9909L156

Custody Transfer Record/Lab Work Request

Page 1 of 1

RECRA LabNet

All FIELD PERSONNEL: COMPLETE ONLY SHADED AREAS

Client: TNU-Hanford B99-075

Est. Final Proj. Sampling Date:

Project #: 10985-001-001-9999-00

Project Contact/Phone #:

RECRA Project Manager: OJ

QC: spec Del: std TAT: 21 day

Date Rec'd: 9.22.99 Date Due: 10/13/99

Account #:

		VOA	BNA	Pest/PCB	Herb				Metal	CN	Hex Chrom					
Refrigerator #				6					6		6					
#/Type Container	Liquid															
	Solid			1ag					1ag		1ag					
Volume	Liquid															
	Solid			60					60		60					
Preservatives																

ANALYSES REQUESTED → ORGANIC: VOA, BNA, Pest/PCB, Herb; INORG: Metal, CN, Hex Chrom

RECRA LabNet Use Only: OPCB; MPBTO/MHGTO; ICRG

MATRIX CODES:
- S - Soil
- SE - Sediment
- SO - Solid
- SL - Sludge
- W - Water
- O - Oil
- A - Air
- DS - Drum Solids
- DL - Drum Liquids
- L - EP/TCLP Leachate
- WI - Wipe
- X - Other
- F - Fish

Lab ID	Client ID/Description	MS	MSD	Matrix	Date Collected	Time Collected	OPCB	MPBTO/MHGTO	ICRG
001	BOWCH8			S	9/20/99	0900	X	X	X

Special Instructions:

saf # B99-075

COMPOSITE WASTE

DATE/REVISIONS:
1. Run Matrix QC
2.
3.
4.
5.
6.

RECRA LabNet Use Only

Samples were:
1) Shipped ✓ or Hand Delivered ___
Airbill # *
2) Ambient or (Chilled)
3) Received in Good Condition (Y) or N
4) Labels Indicate Properly Preserved (Y) or N
5) Received Within Holding Times (Y) or N

COC Tape was:
1) Present on Outer Package (Y) or N
2) Unbroken on Outer Package (Y) or N
3) Present on Sample (Y) or N
4) Unbroken on Sample (Y) or N

COC Record Present Upon Sample Rec't (Y) or N

Cooler Temp. 3.2 °C

011

Relinquished by	Received by	Date	Time
FedEx	D. [signature]	9/22/99	0945

Relinquished by	Received by	Date	Time
	ORIGINAL		
	REWRITTEN		

Discrepancies Between Samples Labels and COC Record? Y or (N)

NOTES:

* 4235795296 10

Bechtel Hanford Inc.		CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	B99-075-16	Page 1 of 1

Collector Fahlberg/Behnke	Company Contact Jason Adler	Telephone No. 373-4316	Project Coordinator TRENT, SJ
Project Designation 105-DR FSB - Soil	Sampling Location 105 DR		SAF No. B99-075
Ice Chest No. SML 510	Field Logbook No. EL-1281		Method of Shipment FEDEX
Shipped To ~~FMA/RECRA~~ RC 9.20.99	Offsite Property No. A990263		Bill of Lading/Air Bill No. CJ 9.21.99 4235 7952 ~~9620~~ 9610
			COA R105D42800

Price Code 8L

Data Turnaround 21 Days

POSSIBLE SAMPLE HAZARDS/REMARKS	Preservation	Cool 4C	Cool 4C	None	None						
	Type of Container	aG	aG	aG	aG						
Special Handling and/or Storage	No. of Container(s)	1	1	1	1						
	Volume	60mL	60mL	60mL	500mL						
SAMPLE ANALYSIS		Chromium Hex - 7196	PCBs - 8080 {Aroclor-1254}	ICP Metals - 6010A (Add-on) {Lead}; Mercury - 7471 - (CV)	See item (1) in Special Instructions.						

Sample No.	Matrix *	Sample Date	Sample Time										
B0WCH8	Soil	9.20.99	0900	X	X	X						B0W	CC8

CHAIN OF POSSESSION	Sign/Print Names		
Relinquished By	Date/Time 1335	Received By	Date/Time 1335
K. Fahlberg / R Fahlberg	9-20-99	RCF 1-C	9-20-99
Relinquished By	Date/Time	Received By	Date/Time
RCF 1-C	9-21-99 0930	C [illegible]	9-21-99 0930
Relinquished By	Date/Time	Received By	Date/Time
C [illegible]	9-21-99 1400	FEDEX	9-21-99 1400
Relinquished By	Date/Time	Received By	Date/Time
Fed Ex	9-22-99 / 0945	[illegible signature]	9-22-99 / 0945

SPECIAL INSTRUCTIONS

(1) Gamma Spectroscopy {Cesium-137, Cobalt-60, Europium-152, Europium-154; Europium-155}; Gamma Spec - Add-on {Barium-133}; Isotopic Plutonium; Isotopic Uranium; Americium-241; Carbon-14; Nickel-63; Technetium-99

COLLECTOR UNAVAILABLE TO SIGN COC

9909L156

Matrix *
Soil
Water
Vapor
Other Solid
Other Liquid

LABORATORY SECTION	Received By	Title	Date/Time
FINAL SAMPLE DISPOSITION	Disposal Method	Disposed By	Date/Time

012

RECRA LabNet
a division of Recra Environmental, Inc.
Virtual Laboratories Everywhere

Recra LabNet Philadelphia
Analytical Report

Client : TNU-HANFORD B99-075
RFW# : 9909L156
SDG# : H0538
SAF# : B99-075

W.O. # : 10985-001-001-9999-00
Date Received: 09-22-99

INORGANIC CASE NARRATIVE

1. This narrative covers the analyses of 1 soil sample.

2. The sample was prepared and analyzed in accordance with the methods checked on the attached glossary.

3. Sample holding times as required by the method and/or contract were met.

4. The cooler temperature was recorded on the chain-of-custody.

5. The method blank for Chromium VI was within method criteria.

6. The Laboratory Control Samples (LCS) for Chromium VI were within the laboratory control limits.

7. The matrix spike recoveries for Chromium VI were within the 75-125% control limits.

8. The replicate analyses were within the 20% Relative Percent Difference (RPD) control limit.

9. Results for solid samples are reported on a dry weight basis.

J. Michael Taylor
Vice President
Philadelphia Analytical Laboratory

10-18-99
Date

njp\i09-156

Recra LabNet Philadelphia

WET CHEMISTRY
METHODS GLOSSARY FOR SOIL/SOLIDS SAMPLE ANALYSIS

	ASTM	SW846	OTHER
% Ash	__ D2216-80		
% Moisture	__ D2216-80		__ ILMO4.0 (e)
% Solids	__		__✓ ILMO4.0 (e)
% Volatile Soilids	__ D2216-80		
ASTM Extraction in Water	__ D3987-81/85		
BTU	__ D240-87		
CEC		__ 9081	__ c
Chromium VI		__✓ 3060A/7196A	
Corrosivity ___ by coupon ___ by pH		__ 1110(mod) __ 9045C	
Cyanide, Total		__ 9010B	__ ILMO4.0 (e)
Cyanide, Reactive		__ Section 7.3	
Halides, Extractable Organic		__ 9020B	__ EPA 600/4/84-008
Halides, Total		__ 9020B	__ EPA 600/4/84-008
EP Toxicity		__ 1310A	
Flash Point		__ 1010	
Ignitability		__ 1010	
Oil & Grease		__ 9071A	
Carbon, Total Organic		__ 9060	__ Lloyd Kahn (mod)
Oxygne Bomb Prep for Anions	__ D240-87(mod)	__ 5050	
Petroleum Hydrocarbons, Total Recoverable		__ 9071	__ EPA 418.1
pH, Soil		__ 9045C	
Sulfide, Reactive		__ Section 7.3	
Sulfide		__ 9030B(mod)	
Specific Gravity	__ D1429-76C/	__ D5057-90	
Sulfur, Total		__ 9056	
Synthetic Prpearation Leach		__ 1312	
Paint Filter		9095A	
Other:	**Method:**		
Other:	**Method**		

Recra LabNet Philadelphia
METHOD REFERENCES AND DATA QUALIFIERS

DATA QUALIFIERS

U = Indicates that the parameter was not detected at or above the reported limit. The associated numerical value is the sample detection limit.

* = Indicates that the original sample result is greater than 4x the spike amount added.

ABBREVIATIONS

MB = Method or Preparation Blank.
MS = Matrix Spike.
MSD = Matrix Spike Duplicate.
REP = Sample Replicate
LC = Laboratory Control Sample.
NC = Not calculated.

A suffix of -R, -S, or -T following these codes indicate a replicate, spike or sample duplicate analysis respectively.

ANALYTICAL WET CHEMISTRY METHODS

1. ASTM Standard Methods.

2. USEPA Methods for Chemical Analysis of Water and Wastes (USEPA 600/4-79-020).

3. Test Methods for Evaluating Solid Waste (USEPA SW-846).

a. Standard Methods for the Examination of Water and Waste, 16 ed, (1983).

b. Standard Methods for the Examination of Water and Waste, 17 ed, (1989)/18ed (1992).

c. Method of Soil Analysis, Part 1, Physical and Mineralogical Methods, 2nd ed, (1986).

d. Method of Soil Analysis, Part 2, Chemical and Microbiological Properties, Am. Soc. Agron., Madison, WI (1965).

e. USEPA Contract Laboratory Program, Statement of Work for Inorganic Analysis.

f. Code of Federal Regulations.

Recra LabNet - Lionville

INORGANICS DATA SUMMARY REPORT 10/01/99

CLIENT: TNU-HANFORD B99-075 RECRA LOT #: 9909L156

WORK ORDER: 10985-001-001-9999-00

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT	DILUTION FACTOR
-001	B0WCH8	% Solids	95.6	%	0.01	1.0
		Chromium VI	0.42 u	MG/KG	0.42	1.0

Recra LabNet - Lionville

INORGANICS METHOD BLANK DATA SUMMARY PAGE 10/01/99

CLIENT: TNU-HANFORD B99-075 RECRA LOT #: 9909L156

WORK ORDER: 10985-001-001-9999-00

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT	DILUTION FACTOR
BLANK10	99LVI067-MB1	Chromium VI	0.40 u	MG/KG	0.40	1.0

Recra LabNet - Lionville

INORGANICS ACCURACY REPORT 10/01/99

CLIENT: TNU-HANFORD B99-075 RECRA LOT #: 9909L156

WORK ORDER: 10985-001-001-9999-00

SAMPLE	SITE ID	ANALYTE	SPIKED SAMPLE	INITIAL RESULT	SPIKED AMOUNT	%RECOV	DILUTION FACTOR(SPK)
-001	B0WCH8	Soluble Chromium VI	4.3	0.42u	4.2	102.0	1.0
		Insoluble Chromium VI	932	0.42u	1180	79.3	100
BLANK10	99LVI067-MB1	Soluble Chromium VI	4.0	0.40u	4.0	99.8	1.0
		Insoluble Chromium VI	1150	0.40u	1160	98.8	100

Recra LabNet - Lionville

INORGANICS PRECISION REPORT 10/01/99

CLIENT: TNU-HANFORD B99-075 RECRA LOT #: 9909L156

WORK ORDER: 10985-001-001-9999-00

SAMPLE	SITE ID	ANALYTE	INITIAL RESULT	REPLICATE	RPD	DILUTION FACTOR(REP)
-001REP	B0WCH8	% Solids	95.6	94.1	1.6	1.0
		Chromium VI	0.42u	0.42u	NC	1.0

Recra LabNet - Lionville Laboratory
INORGANIC ANALYTICAL DATA PACKAGE FOR
TNU-HANFORD B99-075

DATE RECEIVED: 09/22/99 RFW LOT # :9909L156

CLIENT ID /ANALYSIS	RFW #	MTX	PREP #	COLLECTION	EXTR/PREP	ANALYSIS
B0WCH8						
% SOLIDS	001	S	99L%S125	09/20/99	09/22/99	09/23/99
% SOLIDS	001 REP	S	99L%S125	09/20/99	09/22/99	09/23/99
CHROMIUM VI	001	S	99LVI067	09/20/99	09/29/99	09/29/99
CHROMIUM VI	001 REP	S	99LVI067	09/20/99	09/29/99	09/29/99
CHROMIUM VI	001 MS	S	99LVI067	09/20/99	09/29/99	09/29/99
CHROMIUM VI	001 MSD	S	99LVI067	09/20/99	09/29/99	09/29/99
LAB QC:						
CHROMIUM VI	MB1	S	99LVI067	N/A	09/29/99	09/29/99
CHROMIUM VI	MB1 BS	S	99LVI067	N/A	09/29/99	09/29/99
CHROMIUM VI	MB1 BSD	S	99LVI067	N/A	09/29/99	09/29/99

RECRA LabNet Use Only: 9909L156

Custody Transfer Record/Lab Work Request

Page 1 of 1

RECRA LabNet

A11

FIELD PERSONNEL: COMPLETE ONLY SHADED AREAS

Client: TNU-Hanford B99-075

Est. Final Proj. Sampling Date:

Project #: 10985-001-001-9999-00

Project Contact/Phone #:

RECRA Project Manager: OJ

QC: spec Del: std TAT: 21 day

Date Rec'd: 9-22-99 Date Due: 10/13/99

Account #:

	VOA	BNA	Pest/PCB	Herb				Metal	CN	Hex Chrom					
Refrigerator #			6					6		6					
#/Type Container – Liquid															
#/Type Container – Solid			1ag					1ag		1ag					
Volume – Liquid															
Volume – Solid			60					60		60					
Preservatives															

ANALYSES REQUESTED: ORGANIC (VOA, BNA, Pest/PCB, Herb); INORG (Metal, CN, Hex Chrom)

RECRA LabNet Use Only: OPCB; MPBTO MHGTO; ICRG

MATRIX CODES:
S - Soil
SE - Sediment
SO - Solid
SL - Sludge
W - Water
O - Oil
A - Air
DS - Drum Solids
DL - Drum Liquids
L - EP/TCLP Leachate
WI - Wipe
X - Other
F - Fish

Lab ID	Client ID/Description	MS	MSD	Matrix	Date Collected	Time Collected	VOA	BNA	Pest/PCB	Herb				Metal	CN	Hex Chrom
001	BOWCH8			S	9/20/99	0900			X					X		X

Special Instructions:
saf # B99-075

COMPOSITE WASTE

DATE/REVISIONS:
1. Run Matrix QC
2.
3.
4.
5.
6.

RECRA LabNet Use Only

Samples were:
1) Shipped ✓ or Hand Delivered ___
Airbill # *
2) Ambient or (Chilled)
3) Received in Good Condition (Y) or N
4) Labels Indicate Properly Preserved (Y) or N
5) Received Within Holding Times (Y) or N

COC Tape was:
1) Present on Outer Package (Y) or N
2) Unbroken on Outer Package (Y) or N
3) Present on Sample (Y) or N
4) Unbroken on Sample (Y) or N
COC Record Present Upon Sample Rec't (Y) or N
Cooler Temp. 3.2 °C

Relinquished by	Received by	Date	Time
FedEx	D. [illegible]	9/22/99	0945

Relinquished by	Received by	Date	Time
	ORIGINAL REWRITTEN		

Discrepancies Between Samples Labels and COC Record? Y or (N)
NOTES:
* 4235795296I0

Bechtel Hanford Inc.	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	B99-075-16	Page 1 of 1

010

Collector Fahlberg/Behnke	Company Contact Jason Adler	Telephone No. 373-4316	Project Coordinator TRENT, SJ
Project Designation 105-DR FSB - Soil	Sampling Location 105 DR		SAF No. B99-075
Ice Chest No. SML 510	Field Logbook No. EL-1281		Method of Shipment FEDEX
Shipped To ~~TMA~~/RECRA RF 9-20-99	Offsite Property No. A990263		Bill of Lading/Air Bill No. CJ 9.21.99 4235 7952 ~~9620~~ 9610
			COA R105D42800

Price Code 8L

Data Turnaround 21 Days

POSSIBLE SAMPLE HAZARDS/REMARKS Special Handling and/or Storage												
Preservation	Cool 4C	Cool 4C	None	None							
Type of Container	aG	aG	aG	aG							
No. of Container(s)	1	1	1	1							
Volume	60mL	60mL	60mL	500mL							
SAMPLE ANALYSIS	Chromium Hex - 7196	PCBs - 8080 (Aroclor-1254)	ICP Metals - 6010A (Add-on) {Lead}; Mercury - 7471 - (CV)	See item (1) in Special Instructions.							

Sample No.	Matrix *	Sample Date	Sample Time										
B0WCH8	Soil	9-20-99	0920	X	X	X						B0W	CC8

CHAIN OF POSSESSION	Sign/Print Names		
Relinquished By	Date/Time	Received By	Date/Time
K. Fahlberg / R. Fahlberg	9-20-99 1335	RF I-C	9-20-99 1335
RF I-C	9-21-99 0930	C. Price	9-21-99 0930
C. Price	9-21-99 1400	FEDEX	9-21-99 1400
Fed Ex	9-22-99 / 0945	[signature]	9-22-99 / 0945

SPECIAL INSTRUCTIONS

(1) Gamma Spectroscopy {Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155}; Gamma Spec - Add-on {Barium-133}; Isotopic Plutonium; Isotopic Uranium; Americium-241; Carbon-14; Nickel-63; Technetium-99

COLLECTOR UNAVAILABLE TO SIGN COC

9909L156

Matrix *
- Soil
- Water
- Vapor
- Other Solid
- Other Liquid

LABORATORY SECTION	Received By	Title	Date/Time
FINAL SAMPLE DISPOSITION	Disposal Method	Disposed By	Date/Time